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RMD REPORT L-98
A STUDY TO IDENTIFY INVENTORY
CONTROL PROCEDURES AT COMMERCIAL SERVICE
STATIONS IN THE EDMONTON AREA. 1987.

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A Study to Identify Inventory Control Procedures at Commercial Service Stations in the Edmonton Area

RMD Report L-98

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A STUDY TO IDENTIFY INVENTORY CONTROL PROCEDURES AT COMMERCIAL SERVICE STATIONS IN THE EDMONTON AREA

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This report may be cited as:

Marsh, J.R. and C. Dykstra. 1987. A study to identify inventory control procedures at commercial service stations in the Edmonton area. Prep. for Research Management Division, Alberta Environment by Sereda, Marsh & Associates Ltd. RMD Report L-98. 31 pp.

A STUDY TO IDENTIFY INVENTORY CONTROL PROCEDURES AT COMMERCIAL SERVICE STATIONS IN THE EDMONTON AREA

by

J.R. MARSH, P.ENG.
C. DYKSTRA

SEREDA, MARSH AND ASSOCIATES LTD.

for

RESEARCH MANAGEMENT DIVISION

Alberta Environment

RMD Report L-98

1987

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ABSTRACT

This report contains a survey and summary relating to inventory control and reconciliation procedures at urban commercial gasoline service stations in the Edmonton area.

The main objective of the survey was, with emphasis on inventory control, to determine if retail gasoline service stations were completing a daily inventory stock of their underground gasoline storage tanks in compliance with Section 219(1) of the Alberta Fire Code and thereby identify where potential problems may exist. A secondary objective was to determine if station operators/managers were current in Fire Safety Training and other provisions of fire awareness relating to the Fire Code.

The study concludes that although the service station managers feel they have a good awareness of the Fire Code, there are areas of the Code unfamiliar to them, and it is recommended that owners and operators be sent information from the Fire Commissioner, and for independent station owners, some form of training on the reconciliation process should be initiated.

ACKNOWLEDGEMENTS

Sereda, March & Associates Ltd. wishes to express out thanks to the following for helping to supply information necessary for the completion of this report:

1. Alberta Environment - Earth Sciences Division;
2. Alberta Environment - Research Management Division;
3. Imperial Oil Ltd.;
4. Shell Canada Products Ltd.;
5. Petro-Canada Inc.;
6. Gulf Canada Ltd.;
7. Mohawk Oil Company Ltd.;
8. Texaco Canada Inc.;
9. Turbo Resources Ltd.; and
10. Husky Oil Marketing Company.

All of the above co-operated fully in the completion of the study providing information for the survey and guidance to the commercial service station managers.

Sereda, Marsh & Associates Ltd. would also like to express thanks to participating station managers who set aside their time to furnish information.

1. INTRODUCTION

Alberta Environment, Earth Sciences Division and Research Management Division, commissioned Sereda, Marsh & Associates Ltd. (SMA) to conduct a survey relating to inventory control and reconciliation procedures at 'Urban' commercial gasoline service stations in the Edmonton area. Stations owned, operated and/or leased by oil companies and those under 'Independent' management were surveyed at this time. This report has been prepared by SMA under the terms of Contract No. 86-0785 with Alberta Environment.

During the survey, SMA visited a total of 75 commercial service outlets between 1986 February 17 and March 30. The data and our findings are presented in Section 3 of this report. Completed survey forms are available for viewing at the Research Management Division office in Edmonton.

Under Section 219(1) of the Alberta Fire Code, a commercial service station operator must complete a daily inventory check of station underground gasoline storage tanks. The main objective of our survey was, with emphasis on inventory control, to determine if stations were complying with the Code and to identify where potential problems may exist. A secondary objective was to determine if station operators/managers were current in Fire Safety Training and other provisions of fire awareness relating to the Fire Code.

2. METHODOLOGY

2.1 START-UP

According to information supplied by Alberta Environment, there are approximately 320 commercial service stations in the Edmonton area. It was decided to randomly identify 125 stations. These stations would be visited by SMA with a questionnaire that was prepared by Earth Sciences Division of Alberta Environment. Each station operator/manager would be asked to voluntarily complete the questionnaire.

One hundred and twenty-five stations were identified as follows:

1. The 125 stations were subdivided into one group of 50 stations and three groups of 25 stations each. All stations identified were selected from the Edmonton Telephone Directory.
2. The stations were randomly dispersed throughout the Edmonton area. Care was taken to include stations from all known major companies or their affiliates.
3. The percentage breakdown of Edmonton stations by ownership, as provided by Alberta Environment, was reflected as closely as possible in the 125 stations sampled. The breakdown was as follows:
   a. Imperial Oil Ltd. (18%);
   b. Shell Canada Products Ltd. (16%);
   c. Petro-Canada Inc./Gulf Canada Ltd. (22%);
   d. Mohowak Oil Co. Ltd. (11%);
   e. Texaco Canada Ltd. (11%);
   f. Turbo Resources Ltd. (6%); and
   g. Other[1] (Independent or unidentifiable) (16%).

---

1 For the purpose of this report, any station not owned or leased by a major oil company, or their affiliated company, is termed an 'Independent' station.

2.2 THE SURVEY PROCEDURES

To deal with the anticipated problems of obtaining information, two steps were taken. First, letters were obtained from the Deputy Fire Commissioner and Alberta Environment, Earth Sciences Division, which stated the authority for inventory control and support for this study. These letters were presented, where required, to the station managers at the time of initial contact. Secondly, each major oil company was approached to provide assistance to SMA and to help any station operator/manager who might be unsure about information being provided as part of the study.

Each service station operator was telephoned prior to the SMA visit to establish a convenient time for an interview. The station manager was informed of the survey purpose and whom to contact in Alberta Environment for further information.

During each interview, the manager's comments were invited and recorded. Comments and observations by SMA were noted on the questionnaire as well. If there were any particular problems which the manager experienced relating to inventory control, these were noted on the survey form and identified as the "Manager's Comments".

It was noted early in the survey that the 'Tank' information portion of the survey could not be properly filled out by most managers. This information was subsequently obtained directly from oil companies--regional or head offices.

2.3 FOLLOW-UP

A project meeting was held between Alberta Environment and SMA. At this meeting, it was decided to include 75 stations in this phase of the study. Any follow-up visits to clarify information would be scheduled, and the final report would be based upon these 75 stations.

3. RESULTS

3.1 SURVEY BREAKDOWN

In total, 75 commercial outlets were ultimately contacted by SMA for inventory control information. Of these, 66 station managers co-operated fully and provided information to the best of their ability. Three stations, listed in the Edmonton Yellow Pages, were found to be non-operational. Two station managers refused to supply information and four stations were not surveyed after three unsuccessful attempts were made to obtain the necessary information. In total, 107 station visits were carried out by SMA. Appendix I contains a breakdown of stations visited. An example of the survey forms filled out by service station managers is presented in Appendix II.

Station affiliation and ownership is shown in Table 1. It is noted that of the 66 stations completely surveyed, 32 were oil company owned and operated and 34 were leased or owned by 'Independents'.

3.2 BREAKDOWN OF DIPPING PROCEDURES

According to the Alberta Fire Code, underground level fuel storage tanks must be dipped for both product volume and presence of water. Table 2 summarizes the results of current dipping procedures by the stations surveyed. The numbers in brackets indicate the number of manager-leased stations in each category.

The overall trend shows that station managers are much more concerned with product dips than water dips. In most cases, the managers informed SMA that they were not aware of the requirement for a daily check for the presence of water. However, almost all managers were aware that daily product dips were required. There appears to be little difference, regarding dipping procedures, between company-owned and operated stations and the manager-leased stations.

3.3 RECONCILIATION PROCEDURES, FIRE CODE AWARENESS AND SAFETY TRAINING

The Alberta Fire Code requires that reconciliation records be kept by the station operator on at least a daily basis. The Code also specifies that

Table 1. Overall station affiliation and ownership.

	Oil Company Operated	Manager Leased	Total	% of Total
Imperial Oil	5	7	12	18.2
Shell Canada	9	3	12	18.2
Petro-Can/Gulf	5	8	13	19.7
Mohawk Oil	4	2	6	9.1
Texaco Canada	2	6	8	12.1
Turbo Resources	2	2	4	6.1
Independent	5	6	11	16.7
TOTALS	32	34	66	100.0
Unable to Survey	-	-	9	-

Table 2. Dipping procedures for product volume and presence of water.

	Dipping Frequency (by Station)					
	Product		Water			
COMPANY	Daily	Weekly[a]	Daily	Weekly[a]	Monthly[b]	Less than Monthly
Imperial Oil	11(7)[c]	1	0	5(4)	6(2)	1(1)
Shell Canada	11(3)	1	0	10(2)	0	2(1)
Petro-Can/Gulf	12(7)	1(1)	3(2)	4(2)	4(2)	2(2)
Mohawk Oil	6(2)	N.D.[d]	3	2(1)	1(1)	N.D.
Texaco Oil	8(6)	N.D.	2(2)	6(4)	N.D.	N.D.
Turbo Resources	4(2)	N.D.	1	1	2(2)	N.D.
Independent	10(5)	1(1)	2(1)	2(1)	4(2)	3(2)
TOTALS	62(32)	4(2)	11(5)	30(14)	17(9)	8(6)

[a]Stations dip less than daily but at least weekly (i.e., some dip two to three times per week).
[b]Stations dip less than weekly but at least monthly.
[c]The numbers in brackets indicate the number of manager-leased stations in each category.
[d]N.D.: No Data.

Fire Safety Training is manadatory for personnel at each service station. **Table** 3 summarizes the number of stations keeping reconciliation records. As well, Table 3 summarizes the number of stations whose managers feel they have a good awareness of the Alberta Fire Code and the number of stations which at least one staff member trained in fire safety. **Appendix** III shows an example of a typical reconciliation form. Adequate reconciliation records meet the following criteria:

1. The records contain a daily inventory of gasoline storage, deliveries, and sales;
2. A reconciliation between the change in gasoline storage versus the total gasoline sales is completed each day;
3. The station manager understands and can interpret his records; and
4. Daily overages and shortages appear on the reconciliation form.

There are two methods used by station managers for reporting delivery volumes on the reconciliation forms. The manager can report the rack volume which is found on the delivery slip, or he can dip his tanks before and after a delivery and report the change in storage as the delivery volume. In most cases, the rack volume is reported on the reconciliation forms. However, it is common practice for stations to also dip their tanks and record this information separately.

Table 3. Reconciliation records, fire code awareness, and fire safety training.

COMPANY	Reconciliation Records			Fire Code Awareness		Fire Safety Training	
	Proper Records Kept	Not Available	Proper Not Kept	Good Understanding	Not Good	Yes	No
Esso	10	1	1	12	0	6	6
Shell	10	N.D.[a]	2	9	3	4	8
Petro Can/Gulf	9	1	3	11	2	3	10
Mohawk	4	N.D.	2	5	1	2	4
Texaco	6	1	1	6	2	1	7
Turbo	3	1	N.D.	4	0	1	3
Independent	3	1	7	9	2	8	3
TOTALS	45	5	16	56	10	25	41

a N.D. - No Data.

4. EVALUATION

4.1 SUMMARY

The following points summarize the findings of the survey:

1. 17% of the stations met requirements for water dips;
2. 94% of the stations met requirements for product dips;
3. 68% of the stations kept adequate reconciliation records;
4. 85% of the station managers felt they had a good understanding of the Alberta Fire Code; and
5. 38% of the stations had at least one staff member trained or acquainted in fire safety.

4.2 EVALUATION OF SUMMARIZED INFORMATION

1. **Dipping procedures (Table 2)**

   The daily dips are being performed consistently in the case of product dips. The water dips are not consistently done on a daily basis as required by the Alberta Fire Code. Apparently, the managers are not fully aware of this requirement.

2. **Reconciliation procedures (Table 3)**

   Reconciliation records are being kept at the majority of the service stations surveyed. If the stations whose records were unavailable are deleted from Table 3, then 7 out of 10 independent retailers visited did not have adequate reconciliation records. This represents a high percentage especially when compared to the company-owned stations of which 9 out of 51 stations visited did not keep adequate reconciliation records. It should be noted that four independent retailers and three managers of company-owned stations admitted that no reconciliation records were kept at their stations. Again, manager awareness appears to be the major problem. The station managers who are not keeping proper records usually did not understand the record-keeping process.

The contrast between company-owned stations and independent stations, insofar as record-keeping is concerned, relates to training or lack thereof. Managers of company-owned stations usually receive instructions and training in the area of reconciliation procedures from their employing oil companies. The independent managers, on the other hand, receive little or no training, furthermore, those managers operating convenience stores often consider gasoline sales as a secondary, or minor, job-related responsibility.

3. **Fire Safety Training (Table 3)**

   Only 25 of 66 stations visited had staff who had received any fire safety training. The amount of training received varied from simple verbal guidance to attendance at Fire Training Seminars/Courses offered by accredited institutions. As previously noted, many station managers admitted they were unaware fire safety training was a requirement of the Fire Code.

4.3 STATION MANAGER'S COMMENTS

Several station managers stated on the survey form that they would have trouble detecting leaks despite their keeping a reconciliation record on a daily basis. There appear to be several problems with the reconciliation procedure. These are presented as follows:

1. **Dipping practices**

   Splashing the dipstick, using a worn dipstick or misreading the dipstick are all problems which can cause sudden fluctuations in readings for reconciliation records. These fluctuations are usually monitored and are not a cause for concern unless a large shortage of gasoline appears in the record and does not correct itself upon subsequent dipping.

2. **Dipping accuracy**

   A dipstick is usually readable to the nearest 1 or 2 cm. Depending upon the size of the tank, this can lead to a 200 to 400 L difference in volume on the tank charts. When interpreting

reconciliation records, this margin of error must be taken into account.

Station managers have also stated that the chart readings appear high in some areas of the tank and low in others. In one instance, a station manager had been given two separate charts for the same tank. The tank volumes given on each chart were different for the same dipstick readings. Photocopies of some of these charts provided to the station manager are located in Appendix IV. The reason for inconsistent chart readings is unclear at this time.

3. **Gasoline expansion and contraction**

In winter, the gasoline will cool and shrink in volume in the underground tank. This causes what appears to be a gasoline shortage in the reconciliation records. In the summer, the opposite may occur. These seasonal fluctuations may or may not balance by year end.

Often this fluctuation is most severe immediately after a gasoline delivery. Records can show substantial fluctuations after each delivery. A station which sells large quantities of gasoline may receive two or three deliveries per week. With the records fluctuating wildly, leaks are almost impossible to detect at the time of dipping.

A combination of the above problems can have an impact on the reconciliation records. This makes it extremely difficult to interpret the records and can have the effect of masking a leak in an underground tank.

5. CONCLUSIONS

Table 3 indicates that 56 out of 66 station managers felt they had a good awareness of the Alberta Fire Code. However, Table 3 also indicates that 16 of 66 managers were not completing an adequate reconciliation, and only 25 managers had at least one staff member trained in fire safety. Table 2 indicates that only 11 of the 66 stations surveyed did a daily check for water in their tanks. This implies that although the managers of service stations feel they have a good awareness of the Fire Code, there are areas of the Code unfamiliar to them.

It is recommended that all service station owners and operators be sent information from the Fire Commissioner to inform them of requirements under the Alberta Fire Code applicable to them. In the particular case of independent station owners, some form of training may also be required to help the managers understand the reconciliation process.

It should be noted that this survey concentrated only on urban commercial service stations and the problems of inventory control. In the following section, further areas for additional study are identified.

6. ADDITIONAL STUDY SUGGESTIONS

6.1 RURAL, COMMERCIAL GASOLINE OUTLETS

As previously noted, the study reported on at this time concentrated on the urban commercial outlets, particularly in the Edmonton area. To obtain a more complete picture of inventory control, a follow-up study concentrating upon the rural gasoline retailers should also be undertaken. The results of the two studies should be compared to see what differences might exist in the rural setting.

6.2 NON-COMMERCIAL, PETROLEUM STORAGE FACILITIES

The commercial service station situation could be the tip of the iceberg as far as underground petroleum storage is concerned. General contractors, trucking companies, railway yards, and airports are others that use underground storage facilities. The extent of enforcement regarding the Fire Code in these non-commercial areas is unknown. A study of these facilities should also take place and be compared with this study on commercial outlets.

6.3 ACCUMULATION OF EXISTING INFORMATION

Each petroleum retailer has policies regarding inventory control. There have been studies conducted by major oil companies investigating problem areas and alternate inventory control techniques. A complete literature search and review should be undertaken along with a review of all available oil company information. This review would be invaluable in further defining problems and avoiding duplication of effort.

7. APPENDICES

7.1 APPENDIX I QUESTIONNAIRE INDEX OF STATIONS

STATION LISTING

Mohawk Coliseum Self Serve	1
Rene's Auto Repair	2
DarVic's Gas Bar	3
Petrocan Grocery Cart #4	4
Land's Happy Mart	5
Domo Highway	6
Cheap Charlies	7
Eastgate Shell	11
Klondike Shell	12
Shell Food Store (8545 - 82 Avenue)	13
Shell Food Store (St. Albert)	14
Shell Food Store (9431 - 149 Street)	15
Highlands Shell Self Serve	16
Steele Heights Shell	17
Airlines Self Serve	18
Meadowlark Shell Self Serve	19
Grandin Shell Service	20
Century Shell Service	21
Bonaventure Shell Self Serve	22
Roper Esso Self Serve	23
Brentwood Esso	24
Mainway Esso	25
Sherbrooke Esso	26
Argyll Esso	27
Crestview Esso	28
Calder Esso	29
Yellowhead Esso	30
Londonderry Esso	31

continued ...

STATION LISTING (CONTINUED)

Bill's Esso	32
Duggan Esso	33
Millwoods West Esso	34
Sherwood Park Esso	35
Petrolia Gulf	36
Argyll Gulf Self Serve	37
Dawson Motors	38
Sherwood Park Gulf	39
Pleasantview Carwash	40
Sherwood Park Willwin	41
Fas Gas (15411 - 118 Avenue)	42
Fas Gas (6500 Tudor Glen Market)	43
Bonaventure Turbo	44
Turbo 137	45
Meadowlark Turbo	46
Inglewood Turbo	47
Mohawk Roughneck Service	48
Fort Trail Carwash	49
Tipaskan Gulf	50
Grandin Carwash	51
Castledown Services	52
Inglewood Carwash	53
118 Avenue Carwash	54
Sunset Service	55
Argyll Service	56
Lacombe Park Service	57
Mohawk Green Gables	58
Victor's Mohawk	59
Crestwood Mohawk	60
Mohawk Millshaven	61
Dawson Hill Speedway	62
Sherwood Park Texaco	63
High Park Texaco	64

continued ...

STATION LISTING (CONCLUDED)

Texaco Red Rooster	65
Canadian Tire Pit Stop	66
High Park Texaco	67
Ottewell Texaco	68
Millwoods Big Chief Texaco	69

LISTING OF VISITED/CONTACTED STATIONS

Imperial Oil Ltd.

Roper Esso Self Serve	23
Brentwood Esso	24
Mainway Esso	25
Sherbrooke Esso	26
Argyll Esso	27
Crestview Esso	28
Calder Esso	29
Yellowhead Esso	30
Londonderry Esso	31
Duggan Esso	33
Millwoods West Esso	34
Sherwood Park Esso	35

Shell Canada Products Ltd.

Eastgate Shell	11
Klondike Shell Service	12
Shell Food Store (8545 - 82 Avenue)	13
Shell Food Store (St. Albert)	14
Shell Food Store (9431 - 149 Street)	15
Highlands Shell Self Serve	16
Steele Heights Shell	17
Airlines Shell Self Serve	18
Meadowlark Shell Service	19
Grandin Shell Service	20
Century Shell Service	21
Bonaventure Shell Self Serve	22

Petro-Canada Inc./Gulf Canada Ltd.

Petro Can Grocery Cart #4	4
Petrolia Gulf	36
Argyll Gulf Self Serve	37
Sherwood Park Gulf	39

continued ...

Petro-Canada Inc./Gulf Canada Ltd. (Concluded)		
	Pleasantview Carwash	40
	Tipaskan Gulf	50
	Grandin Carwash	51
	Castledown Services	52
	Inglewood Carwash	53
	118 Avenue Carwash	54
	Sunset Service	55
	Argyll Service	56
	Lacombe Park Service	57
Mohawk Oil Company Ltd.		
	Mohawk Coliseum Self Serve	1
	Mohawk Green Gables	58
	Victor's Mohawk	59
	Crestwood Mohawk	60
	Mohawk Millshaven	61
	Dawson Hill Speedway	62
Texaco Canada Inc.		
	Rene's Auto Repair	2
	7-11 Food Store (8930 - 99 Street)	63
	High Park Texaco	64
	Texaco Red Rooster	65
	Canadian Tire Pit Stop	66
	High Park Texaco	67
	Ottewell Texaco	68
	Millwood's Big Chief Texaco	69
Turbo Resources Ltd.		
	Bonaventire Turbo	44
	Turbo 137	45
	Meadowlark Turbo	46
	Inglewood Turbo	47

continued ...

Independent Retailers

DarVic's Gas Bar	3
Land's Happy Mart (6004 - 184 Street)	5
Domo Highway	6
Cheap Charlies	7
Bill Esso[1]	32
Dawson Motors	38
Sherwood Park Willwin	41
Fas Gas (15911 - 118 Avenue)	42
Fas Gas (6500 Tudor Glen Market)	43
Mohawk Roughneck Service[1]	48
Fort Trail Carwash	49

Non-Commercial Stations

Brentwood Carwash & Discount
Fas Gas (4204 - 26 Avenue)
West End Turbo

Stations which did not participate in the survey (See Table 1)

Land's Happy Mart (6009 Millwoods Road)
McQueen Husky
Londonderry Service
Mohawk West Warwick
82 Avenue Carwash
Lansdown Service

---

1 According to information supplied, these stations are independently owned (i.e., the gasoline and property are owned by the manager/operator).

7.2 APPENDIX II
EXAMPLE SURVEY FORM

UNDERGROUND STORAGE TANK STUDY #1
RETAIL STATIONS

A. IDENTIFICATION

NAME OF STATION
Mohawk Coliseum Self Serve
FULL SERVICE/SELF SERVICE/OTHER
Food Store
ADDRESS/LOCATION
11820 - 72 St.
PHONE NO.
471-2370
STATION OWNER (NAME OF COMPANY OR INDIVIDUAL)
Mohawk Oil
STATION OPERATOR/MANAGER
Ozzie Bahry
FUEL SUPPLIER
Mohawk
NAME AND POSITION OF PERSON BEING INTERVIEWED
Ozzie Bahry

B. TANK DESCRIPTIONS (SEE ATTACHED FORM)

C. INVENTORY RECORDS

RECORDS AVAILABLE AT STATION (YES/NO)

IF NO, THEN WHERE?

DAILY RECORD FORM PROVIDED (YES/NO)

IF YES, THEN PROVIDED BY WHOM?
Mohawk Oil
IF NO, THEN WHAT FORM IS USED?

(ATTACH BLANK FORM)

DAILY DIP READINGS

7:00 A.M.

PRODUCT	OPENING (YES/NO)	CLOSE (YES/NO)
WATER	OPENING (YES/NO)	CLOSE (YES/NO)

everyday

DELIVERIES RECORDED (YES/NO)

IF YES, THEN HOW IS THE VOLUME OBTAINED?

Metered at the plant & dipped upon delivery.

CALCULATION OF DAILY METERED SALES (YES/NO)

DAILY RECONCILIATION BETWEEN METERED SALES AND STORAGE CHANGE IN TANK(S) (YES/NO)

NUMBER OF YEARS OF RECORD RETAINED. WHERE ARE THE RECORDS STORED?

1 yr. @ the station. Records prior to this may be @ Mohawk.

WHO PERFORMS DIP AND RECONCILIATION (E.G. MANAGER)?

C. Shift & Manager does the reconciliation.

ARE THE DAILY RECORDS SUFFICIENTLY MAINTAINED SO THAT THE STATION OPERATOR WOULD KNOW THAT THERE IS A PROBLEM WITH A PARTICULAR TANK? ASSESSMENT AND COMMENTS.

The records are good. The manager states that Mohawk also keeps tabs on the records and would inform him if there was a problem that he missed.

DOES THE STATION OPERATOR BELIEVE THAT IT IS HIS RESPONSIBILITY TO RECONCILE DAILY SALES AND STORAGE CHANGE? (YES/NO)

IF NO, THEN WHO DOES HE BELIEVE IS RESPONSIBLE?

DIP STICK

INSPECTION INTACT X MISSING ___ BROKEN ___ WORN ___

D. Operation Procedures

INSTRUCTIONS POSTED

FIRE SAFETY PLAN — POSTED (YES/NO)
TRAINED (YES/NO)

From time to time Mohawk offers training.

E. Fire Code Awareness

IS THE OPERATOR AWARE OF THE CONDITIONS OF THE ALBERTA FIRE CODE APPLICABLE TO SERVICE STATIONS?

Yes.

TANK DESCRIPTIONS

NUMBER OF UNDERGROUND TANKS

3

TANK #	1	2	3
PRODUCT	Regular	Regular	Unleaded EM
TANK MATERIAL			
SIZE (L/GAL)	36,500	36,500	36,500
YEAR INSTALLED			
PROTECTION			
PUMP TYPE			
LEAK DETECTOR			

TANK #	4	5	6
PRODUCT			
TANK MATERIAL			
SIZE (L/GAL)			
YEAR INSTALLED			
PROTECTION			
PUMP TYPE			
LEAK DETECTOR			

7.3 APPENDIX III
EXAMPLES OF CURRENT RECONCILIATION FORMS

M-SS 89 (2-79)

PUMP METER READINGS VERIFICATIONS & DIPS

DATE _____ SHIFT _____ _____

	PUMP NO.	SUPER UNLEADED		REGULAR UNLEADED		REGULAR LEADED		DIESEL	
		DOLLARS	QUANTITY	DOLLARS	QUANTITY	DOLLARS	QUANTITY	DOLLARS	QUANTITY
	12		•		•		•		•
	11		•		•		•		•
	10		•		•		•		•
	9		•		•		•		•
	8		•		•		•		•
	7		•		•		•		•
	6		•		•		•		•
	5		•		•		•		•
	4		•		•		•		•
	3		•		•		•		•
	2		•		•		•		•
	1		•		•		•		•
	TOTALS		•		•		•		•
	PREVIOUS TOTALS		•		•		•		•
A	METER SALES *		•		•		•		•
	METER VERIFICATION		← @		← @		← @		← @

SECTION BELOW TO BE COMPLETED ONCE PER DAY METER READINGS & DIPS TAKEN AT _____ AM PM

** METER ADJUSTMENTS AND TESTS SHOULD BE INDICATED ON REVERSE*

		SUPER UNLEADED			REGULAR UNLEADED			REGULAR LEADED			DIESEL		
		TANK	TOTAL DIP / WATER DIP	QUANTITY	TANK	TOTAL DIP / WATER DIP	QUANTITY	TANK	TOTAL DIP / WATER DIP	QUANTITY	TANK	TOTAL DIP / WATER DIP	QUANTITY
B	PREVIOUS INVENTORY	1		B	1		B	1		B	1		B
C	DELIVERIES INV. NO. _____	2		C	2		C	2		C	2		C
D	AVAILABLE PRODUCT (B + C)	3		D	3		D	3		D	3		D
			DIP QTY. — WATER QTY. = NET CONTENTS			DIP QTY. — WATER QTY. = NET CONTENTS			DIP QTY. — WATER QTY. = NET CONTENTS			DIP QTY. — WATER QTY. = NET CONTENTS	
E	TODAY'S INVENTORY	1	– =		1	– =		1	– =		1	– =	
F		2	– =		2	– =		2	– =		2	– =	
G		3	– =		3	– =		3	– =		3	– =	
H	TOTAL INVENTORY (E+F+G)												
J	SALES BY DIPS (D – H)												
K	DAILY OVERAGE (A – J)												
L	DAILY SHORTAGE (J – A)												
M	PREVIOUS OVERAGE/SHORTAGE												
	CUMULATIVE OVERAGE (K + M)												
	CUMULATIVE SHORTAGE (L + M)												

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PETRO-CANADA

SHIFT CHECKOUT SHEET

SHIFT | DATE: YEAR MONTH DAY

CLOSING METER READINGS

PUMP NUMBER	UNLEADED PREMIUM		UNLEADED REGULAR		REGULAR		DIESEL	
	DOLLARS	LITRES	DOLLARS	LITRES	DOLLARS	LITRES	DOLLARS	LITRES
1								
2								
3								
4								
5								
6								
7								
8								
TOTAL CLOSING								
OPENING								
PUMP SALES								
PRICE/ PER LITRE								
SALES VALUE								

DIP STICK READINGS

TANK	UNLEADED PREMIUM		UNLEADED REGULAR		REGULAR		DIESEL	
	DIP	LITRES	DIP	LITRES	DIP	LITRES	DIP	LITRES
1								
2								
3								
TOTAL								

PRODUCT RECONCILIATION

	UNLEADED PREMIUM	UNLEADED REGULAR	REGULAR	DIESEL
OPENING BOOK INVENTORY				
+ RECEIPTS				
– SALES				
= CLOSING BOOK INVENTORY				
– PHYSICAL INVENTORY				
= OVER (SHORT)				

CASH TALLY

A	____ ×	.01	
	____ ×	.05	
	____ ×	.10	
	____ ×	.25	
	____ ×	.50	
	____ ×	1.00	
	____ ×	2.00	
	____ ×	5.00	
	____ ×	10.00	
	____ ×	20.00	
	____ ×	50.00	
	____ ×		
	TOTAL CHEQUES		
	TOTAL		
B	CREDIT CARDS		
C	PAID OUTS		
D	CHARGE SALES		
E	DISCOUNTS		
F	VOIDS & REFUNDS		
	TOTAL (A-F)		
	C.R. TAPE TOTAL		
	OVER SHORT		
	GAS OVER SHORT		

PRODUCT RECEIPTS

DELIVERY TICKET NUMBER	DIESEL	REGULAR	UNLEADED REGULAR	UNLEADED PREMIUM	DAY	MONTH	YEAR
TOTALS							

SIGNATURE

6321-8204

Meter Sales (litres)

Pump	Super unleaded	Regular	Unleaded	Diesel
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
Total				

Daily Dip Record

Tank No.	Water (centimetres)	Product (centimetres)	Super unleaded (litres)	Regular (litres)	Unleaded (litres)	Diesel (litres)
1						
2						
3						
4						
5						
6						
Total inventory (line 6)						

1. Use correct tank chart to convert net cm of product to litres.
2. If five (5) or more cm of water detected in any underground tank, **immediately** notify your Construction and Maintenance Supervisor.
3. If daily sales/inventory (line 7 of Inventory section) does not reconcile to tolerance of one half of one percent of thruput or is greater than 500 litres **investigate** and establish **why**. Tell your representative; it could be an indication of a leaking tank.

Date

Inventory (litres)

	Super unleaded	Regular	Unleaded	Diesel
1. Opening Inventory				
2. Purchases (Receipts)				
3. Total (1 + 2)				
4. Meter Sales (Thruput)				
5. Balance (3 – 4)				
6. Closing Inventory				
7. (Over) Short				
8. Brought Forward (Over) Short				
9. Cumulative (Over) Short				

Meter Sales (litres)

Pump	Super unleaded	Regular	Unleaded	Diesel
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
Total				

Daily Dip Record

Tank No.	Water (centimetres)	Product (centimetres)	Super unleaded (litres)	Regular (litres)	Unleaded (litres)	Diesel (litres)
1						
2						
3						
4						
5						
6						
Total inventory (line 6)						

1. Use correct tank chart to convert net cm of product to litres.
2. If five (5) or more cm of water detected in any underground tank, **immediately** notify your Construction and Maintenance Supervisor.
3. If daily sales/inventory (line 7 of Inventory section) does not reconcile to tolerance of one half of one percent of thruput or is greater than 500 litres **investigate** and establish **why**. Tell your representative; it could be an indication of a leaking tank.

Date

Inventory (litres)

	Super unleaded	Regular	Unleaded	Diesel
1. Opening Inventory				
2. Purchases (Receipts)				
3. Total (1 + 2)				
4. Meter Sales (Thruput)				
5. Balance (3 – 4)				
6. Closing Inventory				
7. (Over) Short				
8. Brought Forward (Over) Short				
9. Cumulative (Over) Short				

Meter Sales (litres)

Pump	Super unleaded	Regular	Unleaded	Diesel
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
Total				

Daily Dip Record

Tank No.	Water (centimetres)	Product (centimetres)	Super unleaded (litres)	Regular (litres)	Unleaded (litres)	Diesel (litres)
1						
2						
3						
4						
5						
6						
Total inventory (line 6)						

1. Use correct tank chart to convert net cm of product to litres.
2. If five (5) or more cm of water detected in any underground tank, **immediately** notify your Construction and Maintenance Supervisor.
3. If daily sales/inventory (line 7 of Inventory section) does not reconcile to tolerance of one half of one percent of thruput or is greater than 500 litres **investigate** and establish **why**. Tell your representative; it could be an indication of a leaking tank.

Date

Inventory (litres)

	Super unleaded	Regular	Unleaded	Diesel
1. Opening Inventory				
2. Purchases (Receipts)				
3. Total (1 + 2)				
4. Meter Sales (Thruput)				
5. Balance (3 – 4)				
6. Closing Inventory				
7. (Over) Short				
8. Brought Forward (Over) Short				
9. Cumulative (Over) Short				

Meter Sales (litres)

Pump	Super unleaded	Regular	Unleaded	Diesel
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
Total				

Daily Dip Record

Tank No.	Water (centimetres)	Product (centimetres)	Super unleaded (litres)	Regular (litres)	Unleaded (litres)	Diesel (litres)
1						
2						
3						
4						
5						
6						
Total inventory (line 6)						

1. Use correct tank chart to convert net cm of product to litres.
2. If five (5) or more cm of water detected in any underground tank, **immediately** notify your Construction and Maintenance Supervisor.
3. If daily sales/inventory (line 7 of Inventory section) does not reconcile to tolerance of one half of one percent of thruput or is greater than 500 litres **investigate** and establish **why**. Tell your representative; it could be an indication of a leaking tank.

Date

Inventory (litres)

	Super unleaded	Regular	Unleaded	Diesel
1. Opening Inventory				
2. Purchases (Receipts)				
3. Total (1 + 2)				
4. Meter Sales (Thruput)				
5. Balance (3 – 4)				
6. Closing Inventory				
7. (Over) Short				
8. Brought Forward (Over) Short				
9. Cumulative (Over) Short				

7.4 APPENDIX IV
INCONSISTENT TANK CHARTS

GULF CANADA LIMITED

TANK CONVERSION PROGRAM

GAUGE CHART FOR WESTEEL-ROSCO UNDERGROUND STORAGE TANKS

Capacity in Gallons	4,000	5,000
Capacity in Litres	18,184	22,730
Dimensions in Inches	84 x 200	84 x 250
Dimensions in Centimeters	213 x 508	213 x 635
Depth in Centimeters	Tank Volume	in Litres
2	28	35
4	79	99
6	145	181
8	223	278
10	310	387
12	406	508
14	511	638
16	622	777
18	740	924
20	864	1,079
22	994	1,241
24	1,129	1,410
26	1,269	1,585
28	1,414	1,766
30	1,564	1,953
32	1,717	2,144
34	1,875	2,341
36	2,036	2,543
38	2,201	2,749
40	2,370	2,959
42	2,542	3,174
44	2,717	3,392
46	2,894	3,614
48	3,075	3,840
50	3,258	4,069
52	3,444	4,301
54	3,633	4,536
56	3,823	4,774
58	4,016	5,015
60	4,211	5,258
62	4,408	5,504
64	4,607	5,753
66	4,808	6,003
68	5,010	6,256
70	5,214	6,510
72	5,419	6,767
74	5,626	7,025
76	5,834	7,285
78	6,043	7,546
80	6,254	7,809
82	6,465	8,073
84	6,678	8,339
86	6,891	8,605
88	7,106	8,873
90	7,321	9,141
92	7,536	9,410
94	7,752	9,680
96	7,969	9,951
98	8,186	10,222
100	8,403	10,493
102	8,621	10,765
104	8,839	11,037
106	9,057	11,309
108	9,275	11,581
110	9,493	11,853
112	9,710	12,125
114	9,928	12,397
116	10,145	12,668
118	10,362	12,939

... Continued /2

GAUGE CHART FOR WESTEEL-ROSCO UNDERGROUND STORAGE TANKS

Capacity in Gallons	4,000	5,000
Capacity in Litres	18,184	22,730
Dimensions in Inches	84 x 200	84 x 250
Dimensions in Centimeters	213 x 508	213 x 635
Depth in Centimeters	Tank Volume	in Litres
120	10,579	13,209
122	10,795	13,479
124	11,010	13,748
126	11,225	14,016
128	11,439	14,283
130	11,652	14,550
132	11,864	14,814
134	12,075	15,078
136	12,285	15,341
138	12,494	15,602
140	12,702	15,861
142	12,908	16,119
144	13,113	16,375
146	13,317	16,628
148	13,519	16,880
150	13,719	17,130
152	13,917	17,378
154	14,113	17,623
156	14,307	17,866
158	14,500	18,106
160	14,690	18,343
162	14,877	18,577
164	15,062	18,808
166	15,245	19,036
168	15,425	19,260
170	15,601	19,481
172	15,775	19,699
174	15,946	19,912
176	16,113	20,121
178	16,277	20,325
180	16,438	20,525
182	16,594	20,721
184	16,746	20,911
186	16,894	21,096
188	17,038	21,275
190	17,176	21,448
192	17,310	21,614
194	17,438	21,774
196	17,560	21,927
198	17,676	22,072
200	17,785	22,208
202	17,887	22,335
204	17,981	22,452
206	18,065	22,558
208	18,139	22,650
210	18,201	22,727
212	18,246	22,784